

## PATENT SPECIFICATION



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## COMPLETE SPECIFICATION

### Improvement in Method of Continuously Conditioning Conductor Rolls in Continuous Electroplating Processes

I, WILLIAM WARREN TRIGGS, a British subject, of the firm of Marks & Clerk, of 57 & 58, Lincoln's Inn Fields, London, W.C.2, do hereby declare the nature of this invention (which has been communicated to me by Carnegie-Illinois Steel Corporation, a corporation of the State of New Jersey, United States of America, of 434, Fifth Avenue, Pittsburgh, State of Pennsylvania, United States of America), and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

15 The present invention relates to a method of conditioning conductor rolls to establish a good electrical contact between the roll and the metallic strip.

20 In the electroplating of strip material, it is necessary to conduct current into the strip so that the strip is electrically energized. In the past, strip material entering the plating bath is usually covered with a thin film of water, which

25 has a high electrical resistivity and may carry small amounts of salts, dirt and other extraneous matter. The presence of the salts and/or dirt on the surface of the conductor roll results in poor

30 electrical contact at the spots where such matter is present on the roll. This results in localized heating at said spots and when the material is subsequently plated, there are produced localized unplated areas on the plated material, or

35 areas having surface defects.

In the present invention, these defects which are produced upon the surface of the plated material are overcome.

40 An object of the present invention relates to providing good electrical means of conducting current from a source of current supply to the metallic strip through the conductor roll.

45 A further object of the present invention resides in minimizing local heating effects by insuring a clean surface and a good current conducting media between the roll and the strip.

50 A still further object resides in minimizing heat spots, which spots when subjected to a plating operation, are not

readily plated in the uniform manner as the rest of the sheet is plated.

With these objects in view the method 55 of electroplating metallic strip according to the present invention includes passing the metallic strip over a non-immersed entry conductor roll positioned substantially at the point of entry of the electro- 60 lytic plating solution, and directly applying to said entry conductor roll a film of electrolyte, whereby, prior to the immersion of the metallic strip in the said electrolytic plating solution, there is 65 established good electrical contact with the entry conductor roll together with the removal from said conductor roll of any foreign matter tending to produce 70 localized heat areas on the strip.

In order that the invention may be clearly understood reference is made to the accompanying drawing which illustrates by way of example means for carrying out applicant's improved method and 75 in which:—

Figure 1 is a sectional elevation of means for carrying out the present invention;

Figure 2 is a sectional elevation on 80 line II—II of Figure 1; and

Figure 3 is a detailed sectional view of a modification of the manner of feeding the electrolyte to the conductor roll.

Referring to the drawing the roll 2 is 85 a non-immersed entry conductor roll over which the metallic strip passes prior to passing into the electroplating solution. Under the present invention, a thin film of electrolyte, which is the same or sub- 90 stantially the same as that used in the plating tank, is supplied to the surface of the entry conductor roll 2. This film may be supplied to the conductor roll 2 in any suitable manner. However, for 95 the purpose of illustrating one manner of supplying the conductor roll 2 with said electrolyte, a pipe 3 is provided with a plurality of nozzles or openings 4 for spraying electrolyte upon the conductor 100 roll surface. The electrolyte may be pumped in any conventional manner to the pipe 3 for ejection through the nozzles. However, numerous other ways

of doing this can be accomplished, for example, by a wick 5, illustrated in Figure 3, which may be positioned within the electrolyte, or provided with a receptacle 6 for receiving the electrolyte, in any conventional manner, through pipe 7 so that the electrolyte may be capillary attracted to the surface of the roll. This thin film of electrolyte serves to provide a good conducting medium between the surface of the roll and the strip. It also keeps the surface of the roll clean or free from the water, salts, dirt or other extraneous matter which normally will interfere with a good electrical contact between the roll and the continuous strip being fed into the plating bath 8 which is necessary for successful plating operation. By applying the thin film of electrolyte, in any conventional manner, to the surface of the entry conductor roll, such water, salts, dirt or other extraneous matter is removed and the roll kept clean.

The film of electrolyte also replaces the water and because of its high electrical conductivity, provides a medium for establishing the good electrical contact necessary between the strip and the conductor roll.

The present method of conditioning the non-immersed entry conductor roll is a part of a continuous electrochemical process for the treatment of metallic strip.

The continuous strip, indicated at "S", is fed, in any conventional manner into contact with the entry conductor roll 2 and subsequently through an electrolytic bath which for example may be a tin plating solution. The foregoing conditioning of the conductor roll is essential at the entry end to remove from

the roll the water, salts or other extraneous matter required to be removed for establishing the good electrical contact.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. The method of electroplating metallic strip, which includes passing the metallic strip over a non-immersed entry conductor roll positioned substantially at the point of entry of the electrolytic plating solution, and directly applying to said entry conductor roll a film of electrolyte, whereby, prior to the immersion of the metallic strip in the said electrolytic plating solution, there is established good electrical contact with the entry conductor roll together with the removal from said conductor roll of any foreign matter tending to produce localized heat areas on the strip.

2. The method as claimed in claim 1, characterized in that the electrolyte applied to said entry conductor roll is substantially the same as that utilized in said electrolytic plating solution.

3. The method as claimed in claim 1 or 2, characterized in that said electrolyte is applied to said entry roll over its entire effective width as a continuous film whereby good electrical contact is established over the full effective width of the roll.

4. The method as claimed in claim 1 substantially as described with reference to the accompanying drawings.

Dated this 24th day of February, 1942.  
MARKS & CLERK.

[This Drawing is a reproduction of the Original on a reduced scale.]

